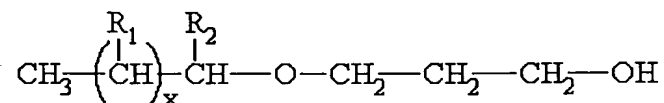


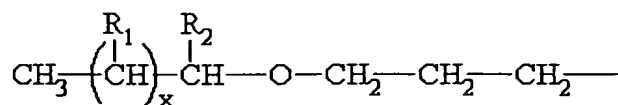
WE CLAIM:

1. A branched alcohol composition comprising a branched ether primary alcohol represented by the formula:



wherein  $\text{R}_1$  represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms,  $\text{R}_2$  represents a hydrocarbyl radical having from 1 to 7 carbon atoms,  $x$  is a number ranging from 0 to 16, wherein the total number of carbon atoms in the alcohol ranges from 9 to 24.

2. The branched alcohol composition of claim 1 wherein  $\text{R}_2$  is a hydrocarbyl radical having 1 carbon atom.
3. The branched alcohol composition of claim 2 wherein  $\text{R}_1$  is hydrogen.
4. The branched alcohol composition of claim 1 wherein  $x$  is a number ranging from 3 to 13.
5. An alkyl ether sulfate composition comprising an alkyl ether sulfate represented by the formula:  
 $\text{XOSO}_3\text{M}$ , wherein  $\text{M}$  is hydrogen or a cation, and  $\text{X}$  is represented by the formula



wherein  $R_1$  represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms,  $R_2$  represents a hydrocarbyl radical having from 1 to 7 carbon atoms,  $x$  is a number ranging from 0 to 16, wherein the total number of carbon atoms in the alkyl ether sulfate ranges from 9 to 24.

6. The alkyl ether sulfate composition of claim 5 wherein  $M$  is hydrogen.

7. The alkyl ether sulfate composition of claim 5 wherein  $M$  is a cation effective to provide a water soluble alkyl ether sulfate composition.

8. The alkyl ether sulfate composition of claim 7 wherein  $M$  is selected from the group consisting of ammonium, alkanolammonium, monovalent metal cations, and polyvalent metal cations.

9. The alkyl ether sulfate composition of claim 5 wherein  $R_2$  is a hydrocarbyl radical having 1 carbon atom.

10. The alkyl ether sulfate composition of claim 9 wherein  $R_1$  is hydrogen.

11. The alkyl ether sulfate composition of claim 5 wherein  $x$  is a number ranging from 3 to 13.

12. The alkyl ether sulfate composition of claim 6 wherein  $R_2$  is a hydrocarbyl radical having 1 carbon atom.

13. The alkyl ether sulfate composition of claim 12 wherein  $R_1$  is hydrogen.

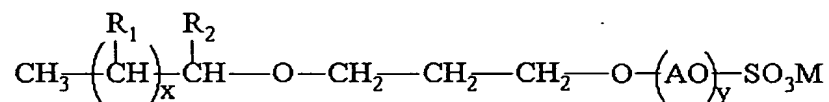
14. The alkyl ether sulfate composition of claim 6 wherein x is a number ranging from 3 to 13.

15. The alkyl ether sulfate composition of claim 7 wherein R<sub>2</sub> is a hydrocarbyl radical having 1 carbon atom.

16. The alkyl ether sulfate composition of claim 15 wherein R<sub>1</sub> is hydrogen.

17. The alkyl ether sulfate composition of claim 7 wherein x is a number ranging from 3 to 13.

18. An alcohol alkoxysulfate composition comprising an alcohol alkoxy sulfate represented by the formula:



wherein R<sub>1</sub> represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms, R<sub>2</sub> represents a hydrocarbyl radical having from 1 to 7 carbon atoms, x is a number ranging from 0 to 16, A is an alkylene radical having carbon number in the range of 2 to 4, y is a number ranging from 1 to 9, wherein the total number of carbon atoms in the alcohol alkoxysulfate excluding A ranges from 9 to 24, and M is hydrogen or a cation.

19. The alcohol alkoxysulfate composition of claim 18 wherein A is an alkylene radical having carbon number in the range of 2 to 3.

20. The alcohol alkoxysulfate composition of claim 19 wherein A is an alkylene radical having carbon number of 2.

21. The alkyl ether sulfate composition of claim 18 wherein M is hydrogen.

22. The alkyl ether sulfate composition of claim 18 wherein M is a cation effective to provide a water soluble alkyl ether sulfate composition.

23. The alkyl ether sulfate composition of claim 22 wherein M is selected from the group consisting of ammonium, alkanolammonium, monovalent metal cations, and polyvalent metal cations.

24. The alkyl ether sulfate composition of claim 18 wherein R<sub>2</sub> is a hydrocarbyl radical having 1 carbon atom.

25. The alkyl ether sulfate composition of claim 24 wherein R<sub>1</sub> is hydrogen.

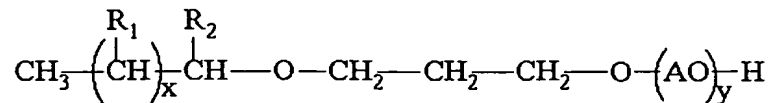
26. The alkyl ether sulfate composition of claim 18 wherein x is a number ranging from 3 to 13.

27. The alkyl ether sulfate composition of claim 20 wherein R<sub>2</sub> is a hydrocarbyl radical having 1 carbon atom.

28. The alkyl ether sulfate composition of claim 27 wherein R<sub>1</sub> is hydrogen.

29. The alkyl ether sulfate composition of claim 20 wherein x is a number ranging from 3 to 13.

30. A branched alkanol alkoxylate composition comprising an alkanol alkoxylate represented by the formula:



wherein R<sub>1</sub> represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms, R<sub>2</sub> represents a hydrocarbyl radical having from 1 to 7 carbon atoms, x is a number ranging from 0 to 16, A is an alkylene radical having carbon number in the range of 2 to 4, y is a number ranging from 1 to 9, wherein the total number of carbon atoms in the alkanol alkoxylate excluding A ranges from 9 to 24.

31. The branched alkanol alkoxylate composition of claim 30 wherein A is an alkylene radical having carbon number in the range of 2 to 3.

32. The branched alkanol alkoxylate composition of claim 31 wherein A is an alkylene radical having carbon number of 2.

33. The branched alkanol alkoxylate composition of claim 30 wherein R<sub>2</sub> is a hydrocarbyl radical having 1 carbon atom.

34. The branched alkanol alkoxylate composition of claim 33 wherein R<sub>1</sub> is hydrogen.

35. The branched alkanol alkoxylate composition of claim 30 wherein x is a number ranging from 3 to 13.

36. The branched alkanol alkoxylate composition of claim 32 wherein  $R_2$  is a hydrocarbyl radical having 1 carbon atom.

37. The branched alkanol alkoxylate composition of claim 36 wherein  $R_1$  is hydrogen.

38. The branched alkanol alkoxylate composition of claim 32 wherein  $x$  is a number ranging from 3 to 13.

39. A detergent composition comprising the alkyl ether sulfate composition of claim 5.

40. A detergent composition comprising the alkyl ether sulfate composition of claim 6.

41. A detergent composition comprising the alkyl ether sulfate composition of claim 7.

40. A detergent composition comprising the alkyl ether sulfate composition of claim 9.

41. A detergent composition comprising the alkyl ether sulfate composition of claim 11.

42. A detergent composition comprising the alcohol ethoxysulfate composition of claim 18.

43. A detergent composition comprising the alcohol ethoxysulfate composition of claim 20.

44. A detergent composition comprising the alcohol ethoxysulfate composition of claim 22.

45. A detergent composition comprising the alcohol ethoxysulfate composition of claim 24.
46. A detergent composition comprising the alcohol ethoxysulfate composition of claim 26.
47. A detergent composition comprising the alkanol alkoxylate composition of claim 30.
48. A detergent composition comprising the alkanol alkoxylate composition of claim 32.
49. A detergent composition comprising the alkanol alkoxylate composition of claim 33.
50. A process to produce a branched alcohol composition comprising:  
contacting an olefin having an average carbon number in the range of 3 to 18 with 1,3-propane diol in the presence of a catalyst effective to react the olefin with the diol under conditions effective to produce the branched alcohol composition.
51. The process of claim 50 wherein the catalyst is an acid catalyst.
52. The process of claim 51 wherein the average carbon number of the olefin is in the range of 6 to 18.
53. The process of claim 51 wherein the diol and olefin is contacted at a temperature within the range of from 50 °C to 250°C.

54. A process to produce a branched alkyl ether sulfate composition comprising:

- a) contacting an olefin having an average carbon number in the range of 3 to 18 with 1,3-propane diol in the presence of a catalyst effective to react the olefin with the diol thereby producing a branched alcohol composition; and
- b) contacting the branched alcohol composition with a sulfating agent under conditions effective to produce a branched alkyl ether sulfate composition.